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DESCRIPTION OF PLATE X.

Figs. 1– 5. *Puccinia heterospora*, B. and C. The spore contents are not drawn with the same magnifying power.
6–21. *Puccinia heterogenea*, n. s.
1– 3. One-celled spores.
4– 5. Two-celled spores.
6– 9. Two-celled spores, of which 7 and 9 have germinated.
10–13. One-celled spores, of which 12 and 13 have germinated.
14. A one-celled spore which has germinated, and the promycelium divided into five cells.
15. A two-celled germinated spore; the promycelium has divided into four cells.
16. Sporidia.
17. A germinated spore whose promycelium has fallen apart into single cells.
18. Isolated cells of the promycelium.
19–21. Spores which have germinated in water and formed a long germ tube. In Fig. 21 the germ tube is branched at the end.

REVIEWS OF RECENT LITERATURE.

BREFELD, OSCAR.—*Untersuchungen aus dem Gesammtgebiete der Mykologie. Heft IX.* Munster i. W. 1891, pp. VIII, 156, pl. 4.

This indefatigable German botanist has recently given to the press the ninth part of the above work, and by this time no doubt has the tenth part before the public. These two parts represent 10 years of investigation, the last four of which have been entirely devoted to this work. Owing to the loss of one eye he has been obliged to have the constant help of an assistant, whose aid he acknowledges both in the prospectus and on the title page. The assistants in the work were Dr. Franz von Tavel and Dr. Gustav Lindau.

Dr. Brefeld feels that with the issue of these two parts and the plans of three more in hand, he can at least fully claim that he has laid the foundation for a natural system in the classification of fungi—a system which hitherto has made itself painfully conspicuous by its absence, and which can not be too warmly welcomed, or too thoroughly studied by American mycologists.

Part IX consists of five divisions. The first division is explanatory of the rest. The second takes up spermatia and their culture in nutrient solutions, shows that they are capable of germination and independent development and hence are a form of asexual reproduction distinguished from other spore forms only by their size.

Division 3 deals with the asci of Ascomycetes in their relation to basidia and simpler fruit forms. In this the author traces the relationship between conidia and sporangia and attempts to establish that the former is only a variation of the latter. Starting with these two he traces the development of sporangia to asci, and of the conidia through the simpler basidia forms to the more complex forms involved in the Basidiomycetes. The transition forms between the Phycomycetes on the one side and the Ascomycetes and Basidiomycetes on the other he uses to form a new class, the Mesomycetes, and divides it into the two parts Hemiasci and Hemibasidii. The fourth division is devoted to the former of these and treats *Ascoidea rubescens*, *Protomyces pachydermus*, and *Thelobolus stercoreus* in detail.

The Ascomycetes are further divided into the Exoasci and Carpoasci, and the fifth division takes up four species of the former. The Carpoasci are treated in part x.

The prospectus for these two parts also announces the subject matter for three more, one of which, the eleventh, is now nearly completed and will form a continuation of part v on the Ustilagineæ, which Brefeld ranks with the Hemibasidii.

Part XII will give his culture methods in detail, and XIII will begin the supplement to his earlier researches on the higher fungi.—E. A. SOUTHWORTH.

COMES, Dr. O. *Crittogamia Agraria.* Naples, 1891. Pp. 600, pl. XVII.

This work, which has just been issued by Dr. Comes, will be of great value to American workers, especially as it brings together in convenient form the latest information on the plant diseases of a number of countries where the literature is scattered and hard to obtain. The first 15 pages of the book are devoted to a discussion of the effects of soil, air, temperature, etc., on vegetation. This is done, so the author states, to render what is said upon parasitic fungi more readily understood. After discussing the nature of parasitic fungi, polymorphism, germination of spores, classification, etc., the diseases of plants caused by the Peronosporeæ are taken up. Under this head a number of well known parasites, such as *Phytophthora infestans*, *Peronospora parasitica*, *Plasmopara viticola*, etc., are discussed. Following this are nearly 400 pages of observations on a long list of fungous diseases.

Chapter XXX, which opens on the 493d page, deals with the bacterial diseases of plants. Beginning with pear blight, the author discusses a bacterial disease of corn, mulberry, sorghum, potato, onion, hyacinth, pelargonium, pine, olive, and grape (stem). The tubercles found on legumes also receive considerable attention in this chapter. The volume concludes with a chapter on Myxomycetes and a good index.—B. T. GALLOWAY.

MORGENTHALER, J. *Der Falsche Mehltau, sein Wesen und seine Bekämpfung.* Zürich, 1891. Pp. 73, figs. 5.

German viticulturists have not as yet been obliged to combat the black rot fungus; but since 1880, when the downy mildew was first found in Switzerland, this latter fungus has gradually forced itself upon their